



LAWRENCE
LIVERMORE
NATIONAL
LABORATORY

Chair Report Consultancy Meeting on Nuclear Security Assessment Methodologies (NUSAM) Transport Case Study Working Group

D. Shull

August 19, 2015

Disclaimer

This document was prepared as an account of work sponsored by an agency of the United States government. Neither the United States government nor Lawrence Livermore National Security, LLC, nor any of their employees makes any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States government or Lawrence Livermore National Security, LLC. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States government or Lawrence Livermore National Security, LLC, and shall not be used for advertising or product endorsement purposes.

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

Chair Report
Consultancy Meeting on Nuclear Security Assessment Methodologies
(NUSAM) Transport Case Study Working Group

10-14 August, 2015

VIC Room M: M0E12, Vienna International Centre, Vienna, Austria

Report Chair: Doug Shull

The purpose of the consultancy assignment is to (i) apply the NUSAM assessment methods to hypothetical transport security table top exercise (TTX) analyses and (ii) document its results to working materials of NUSAM case study on transport.

Mr. Al Garrett, the IAEA secretary for the NUSAM project, welcomed the attendees to the meeting. Since multiple attendees were invited from different organizations, the attendees introduced themselves.

Mr. Dyrk Greenhalgh presented the Oak Ridge National Laboratory (ORNL) Battleboard exercise methodology and provided some lessons learned from his global transportation table top experiences. Ms. Janice Leach then presented the Sandia Table Top Exercise methodology and described the main differences from the ORNL process.

It was decided to conduct Theft I, Theft II and Sabotage I (based on consequence of event) TTX scenarios as presented in the NUSAM Transportation Case Study draft version for the base cases and upgrade cases using both TTX methodologies for comparative purposes. Red (adversary), blue (guards) and green (judges and moderators) teams were assigned and rotated for each scenario. Ten TTXs were performed over the week long meeting. IAEA staff, Mr Khaliq and Ken Brooks observed one of the TTX sessions.

The results of the TTX exercises reinforced the importance for the adversary and response teams to fully understand the written procedures for response, equipment, communications and emergency actions prior to beginning the TTX.

Using the results of TTX methodologies the following WG observations were noted:

- The overall timelines for each tested methodology are comparable,
- Initial Probability of Hit/Probability of Kill (Ph/Pk) proficiency was much different between the tested methods, (see below discussion)
- Strong personalities and personal bias can potentially drive the results of the TTX. It is important for the green team to provide unbiased judgement.
- The fidelity of desired analysis or purpose of the evaluation will determine which analysis methods are utilized. Since the TTX has limitations, the use of multiple type of analysis tools (TTX, path analysis, simulation, etc.) is always recommended when evaluating adversary, response and facility characteristics.
- The use of validated performance data and assumptions increases reliable TTX results.
- Both TTX methods can be used for general sensitivity analysis of existing and proposed upgrades to the protection measures.
- TTXs are a good teaching tool for regulator and operator use.

- TTX should emphasize the overall system performance under security or emergency conditions versus the strict reliance of a scenario win-loss outcome.
- Due to potential differences between fixed site and transportation attack and defence strategies it may be helpful to utilize different TTX methodologies.

Mr. Pär Lindahl demonstrated a simplified comparative study for the Sandia, ORNL and real time (simultaneous engagement) Ph/Pk models. The comparison indicated the Sandia “three dice” x “three rolls” within one 30 second round provided a very strong advantage for the first shooter sequence but a single three dice roll resulted in similar outcome for all three Ph/Pk models. This was supported by observations during the weeks TTXs.



Figures 1 and 2: Transportation Table Top Exercise Process

Additional information for the weeks activities will be included in the detailed Transportation Case Study Meeting Report. Also additional comparative data will be available following the NUSAM Nuclear Power Plant Case Study 2-6 November 2015, TTX meeting in Albuquerque, NM, USA and the Irradiator Facility Case Study.

Table 1. Future Activities

TBD	Irradiator Case Study Table Top, Location TBD
Sept 14 – 16, 2015	VA Tools Workshop, (INMM) Boston, US
Oct 16, 2015	Completion of NUSAM Transportation Case Study Report – Draft
Dec 30, 2015	Completion of NUSAM Transportation Case Study Report – Final
Nov 2-6, 2015	NUSAM NPP working groups, NM
March 2016	NUSAM Analysis working group, ROK
Q2 2016	The 2 nd Research Coordination Meeting on NUSAM to conclude overall NUSAM project

Annex 1: Agenda

Annex 1

Agenda

<i>Date</i>	<i>Time</i>	<i>Schedule</i>
10 August Monday	09:30 – 10:30	Welcome, Opening Remarks and Statement of Objectives
	10:30 – 17:30	Review of Working Materials on Transport Security Familiarization/Review TTX Methodologies Propose for Exercises Discussion of Four Scenarios to Evaluate Determine Necessary Inputs and Objectives of NUSAM TTX <ul style="list-style-type: none"> • Table-top analysis, Orientation Scenario
11 August Tuesday	09:00 – 17:30	Discussion on TTX Assessment Methodology for Transport Security <ul style="list-style-type: none"> • Table top Transport Scenario #1 • Record and Discuss Outcomes/Lessons Learned
12 August Wednesday	09:00 – 17:30	Development of Scenarios <ul style="list-style-type: none"> • Table top Transport Scenario #2 • Record and Discuss Outcomes/Lessons Learned
13 August Thursday	09:00 – 17:30	Application of Assessment <ul style="list-style-type: none"> • Table top Transport Scenario #3 • Table top Transport Scenario #4 • Record and Discuss Outcomes/Lessons Learned
14 August Friday	09:00 – 17:30	Application of Assessment <ul style="list-style-type: none"> • Review of Scenarios and Data Collected • Input to Draft report of TTX analyses • Documents results and Discuss future plans

Prepared by LLNL under Contract DE-AC52-07NA27344.